

## **Formation and Stacked Layers of Quantum Dots**

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The three dimensional growth which occurs at the initial stage of the heteroepitaxial growth of a lattice-mismatched system has been proposed for the realization of a mesoscopic structure. This mesoscopic island structure can be utilized as quantum dots (QDs). They are naturally formed with the Stranski-Krastanov growth mode. It has been called self- or naturally- formed QDs. The strain energy of the QD is calculated by valence-force field model, and then the physical background of the formation of QDs is described. The experimental results of InAs/GaAs and InP/GaP QDs are presented.

The stacked layers of InAs/GaAs QDs depend greatly on the thickness of the GaAs spacer. The QD can be neither stacked nor vertically ordered, when the thickness is thicker than  $2h$  where  $h$  denotes the QD height. The QDs are crushed, when the spacer is thinner than  $h$ . The vertically ordered QDs are stacked when the GaAs spacer thickness is between  $h$  and  $2h$ . The vertical ordering dependent on the spacer thickness is shown by the transmission electron microscope images of cross-sectional stacked layers.